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AB - J78039374 Method for producing a Ni plated steel sheet to be formed into a battery casing comprises forming a Ni layer on one or both surfaces of a cold rolled steel sheet by electroplating, and annealing the Ni plated steel sheet at 840-900 degrees C in a H2+N2 gas stream.

 Method prevents formation of cracks in the Ni coating during deep drawing or pressing of the Ni plated steel sheet.

IW - NICKEL ELECTROPLATING STEEL SHEET PRODUCE MANUFACTURE BATTERY CASING SILVER MERCURY CELL

IKW - NICKEL ELECTROPLATING STEEL SHEET PRODUCE MANUFACTURE BATTERY CASING SILVER MERCURY CELL

NC - 001

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PAW - (SUWA) SUWA SEIKOSHA KK

Ti - Nickel-electroplated steel sheet prodn. - for mfr. of battery casings for silver or mercury cells

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(54)【銀電池または水銀電池容

器の製造方法】

(54)[Manufacturing method of a silver battery or a mercury battery container]

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【図面の簡単な説明】

第1図は焼鈍しない場合のメッキ割れを示す図、第2図は一般的な焼鈍を施した場合の図、第3図、第4図は本発明による焼鈍処理を施した場合の効果を示す図である。

[BRIEF EXPLANATION OF DRAWINGS]

Figure 1 is a figure showing the plating crack in the case of not performing an anneal, and Figure 2 is a figure at the time of giving a general anneal, and Figure 3 and figure 4 are figures showing the effect at the time of performing the anneal process by this invention.

【発明の詳細な説明】

本発明は銀電池及び水銀電池

[DETAILED DESCRIPTION OF INVENTION]

This invention relates to below. The anneal processing method for crack prevention of the



の容器等の材料として用いられ ている冷間圧延鋼板等のプレス 絞り材に電気ニッケルメッキを 施した後、これをプレス絞り加 工を行なう場合のメッキ層の割 れ防止の為の焼鈍処理方法に関 するものである。

本発明の目的はこの点に着目 しメッキ面の光沢度を低下させ ずにプレス絞り加工によるメッ キ割れを完全防止することので きる能率的焼鈍処理方法を提供 するものである。

以下本発明による処理方法に ついて詳細に説明する。

プレスによる絞り加工を行な う製品は絞り加工後にメッキ ・製品は絞り加工後にメッキ ・電池及び水銀電池の容器の如 ・電池及び水銀電池の容器の如 ・電池及び水銀電池の容器の ・電池及び水銀電池の容器の ・電池及び水銀電池の容器の ・電池及び水銀電池の容器の ・電池及び水銀電池の容器の ・電池及び水銀電池の容器の ・であるものはプレスに メッキと要のあるものじめ材料が といると とは明らかである ・であることは明らかである。

しかしこの場合問題となるの が上述の如き絞り加工の際のメ ッキの剥離、割れの現象である。 メッキ割れは周知の如くメッキ plated layer in the case of performing a drawing process, after giving electric nickel plating to drawing materials, such as the cold rolled steel plate used for material, such as the receptacle of a silver battery and a mercury battery

Since exfoliation and the crack of plating arise when performing the drawing process of the material which processed plating beforehand generally, the kind and the thickness of plating are limited.

Moreover, although it was known that an anneal process will be performed when required, it was difficult to solve completely full prevention of a reduction of the glossiness of the plating surface by anneal process, and a microscopic plating crack, and the problem of process efficiency.

The objective of this invention provides the efficient anneal processing method which can carry out full prevention of the plating crack by the drawing processing, without making the glossiness of a plating surface reduce paying attention to this point.

The processing method by this invention is explained in detail below.

It is common to process plating after a drawing process for the product in which the drawing process by the press is performed.

However, it is clear to that which has the need of giving the plating process different from the copper coating and electric nickel plating in the both of right and reverse side like the receptacle of a silver battery and a mercury battery that it is more efficient to process plating into material beforehand before a drawing process.

However it is the phenomenon of exfoliation and the crack of the plating in the case of the above drawing process to become a problem in this case.

As is well-known, a plating crack becomes the cause of exfoliation of plating. In above, it is not desirable on a rust proof.



の剥離の原因となると共に、防 錆上好ましくない。従って電子 ニッケルメッキの厚みはいまで 小限に押えると共にメット浴 類も電常用いられるワット浴 が行なわれる。 が行なわれる。 が行なわれる。

第2図は真空焼鈍炉を使用して真空度10-3mmHg温度700℃で 10 分間加熱後徐冷したものでメッキ層の割れは依然認められ、焼鈍がまだ不完全であることを示している。

更に真空焼鈍炉で温度を700℃にして20分間加熱したもの又800℃で10分間加熱したものはメッキ面に表面酸化によるくもりが生じたり又は全く光沢が失なわれてしまうし、しかもこれらの条件によっても割れを完全に防止することは出来ない。

これに対して窒素ガス及び水素ガスによる雰囲気連続焼鈍炉を使用し温度を 840℃-900℃に保ち 1~2 分間にわたり連続焼鈍した場合を第3図に示すがメ

Therefore the thickness of electric nickel plating is pressed down to necessary minimum. Furthermore, the sulfamic acid nickel plating bath with a stress in electrodeposits lower than the usual Watts bath used is used. Moreover in order to make hardness reduce, reducing the additional amount of a glossing agent is performed.

However as shown in figure 1, full prevention of the crack of the plated layer by the drawing process cannot be performed only with above plating-means.

Therefore after generally above consideration is performed, although an anneal process is performed further, it is very difficult to process efficiently and to attain the objective, without making the glossiness of an electric nickel plating surface reduce.

Figure 2 is what was slow-cooled after the heating for 10 minutes at the degree of vacuum 10-3 mmHg and temperature of 700 degree C using the vacuum annealing reactor, the crack of a plated layer is still observed, and it is shown that an anneal is still imperfect.

Furthermore the fogging by surface oxidation will produce in a plating surface, as for what was heated for 20 minutes at 700 degree C or heated for 10 minutes at 800 degree C in the vacuum annealing reactor, or it will completely lose a glossiness. And a crack cannot be completely prevented even by these conditions.

On the other hand the case where kept temperature at 840 degree C -900 degree C using the atmosphere continuous annealing furnace by nitrogen gas and hydrogen gas, and a continuous annealing is performed through for



ッキ層の割れは完全に消え、し かも焼鈍によるくもりも発生し ない。

この場合は第4図に示す如く ワット浴の場合でもメッキ割れ は生ぜず又光沢剤等の添加物の 量にもあまり影響されない。な お、炉内温度を 840℃以下にし た場合は焼鈍が完全に行われ ず、プレス絞り加工の時点で割 れが発生する。

又、900℃以上に上げた場合 ない。

又、焼鈍時間を1分以下にし た場合、焼鈍が完全に行われず、 プレス絞り加工の時点で割れが 発生する。

又、2 分以上の時間をかけて 焼鈍した場合はニッケルの表面 にくもりが発生して外観的によ い製品ができない。即ちプレス 絞り加工によるメッキ割れの現 象はメッキ処理による要因より も、焼鈍処理による要因が大き くきいていることがわかる。従 って、真空炉を使用することは 甚だ非能率であるがこのような 連続焼鈍炉を使用した場合は短 尺材であっても連続したフープ 材であっても能率は極めてよ く、又メッキ処理条件に余り影 響されずに簡単に電気ニッケル メッキ被覆材の焼鈍処理が行な える上、プレス絞り加工に対す る効果は極めて大きい。

(57)【特許請求の範囲】

1 銀電池または水銀電池の容器 用材科として用いられる冷間圧 延鋼板の材料の片面または両面

1- 2 minutes is shown in Figure 3. The crack of a plated layer disappears completely and, moreover, does not generate the fogging by the anneal, either.

In this case as shown in figure 4, a plating crack is not generated in the case of a Watts bath, either. Moreover it is seldom influenced by the quantity of additives, such as a glossing agent.

In addition, when temperature in the furnace is made into 840 degree C or less, an anneal is not performed completely but a crack generates at the time of a drawing processing.

Moreover, when raising to 900 degree Cor 生して外観的によい製品ができ nickel and the surface of a second surface of a s nickel, and the good product in terms of an outward appearance is not made.

> Moreover, when an anneal time is carried out in 1 or less minute, an anneal is not performed completely but a crack generates at the time of a drawing processing.

> Moreover, when an anneal is performed for 2 minutes or more, the fogging generates on the surface of a nickel, and the good product in terms of an outward appearance is not made.

> That is, it turns out that the phenomenon of the plating crack by the drawing process is based on the factor by anneal process rather than the factor by plating process.

> Therefore, although it was very inefficient to have used a vacuum reactor, when using such a continuous annealing furnace, efficiency is very good even when it is the hoop which continued even when it was the short material. Moreover an anneal process of an electric nickel plating covering material can be simply carried out without being influenced by the conditions of plating process. Moreover, the effect with respect to a drawing process is very large.

(57)[CLAIMS]

After coating electric nickel plating beforehand before drawing process to one side or both sides of material of a cold rolled steel plate



に絞り加工前にあらかじめ電気ニッケルメッキを被覆した後で、窒素ガスおよび水素ガスの雰囲気から成る焼鈍炉を使用し、炉内温度を 840~900℃に保ち、1~2 分間焼鈍することを特徴とする銀電池または水銀電池容器の製造方法。

(56)【引用文献】 特公昭 44-14572

 $\{g(g)\}_{i=1}^{n}$

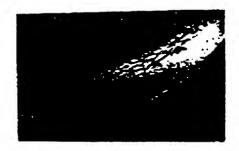
which are used for the receptacle material of a silver battery or a mercury battery, the annealing furnace which consists of the atmosphere of nitrogen gas and hydrogen gas is used.

The anneal is performed for 1- 2 minutes maintaining the temperature in the furnace to 840-900 degree C.

The manufacturing method of a silver battery or mercury battery receptacle characterized by the above-mentioned.

(56)[Reference literature]
Japanese Patent Publication No. 44-14572

才1回



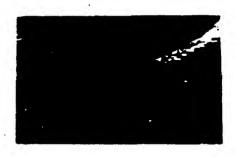
才2回



才3团



才4团



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